

REMARKS**Claim Status**

Claims 1-76 were presented in the Application as filed. Claims 77-85 have been added by the Preliminary Amendment of March 21, 2007. Claim 86 is added by the present Amendment.

In the Office Action dated December 21, 2006, the Examiner restricted the invention into three groups: Group I (Claims 1-48, drawn to a method of recording/reading), Group II (Claims 49-75, drawn to an apparatus), and Group III (Claim 76, drawn to an information storage device comprising optical recording media). The Examiner also requested election of a species for the purposes of searching from among the species depicted on Figures 1 through 7.

By their Preliminary Amendment of March 21, 2007 Applicants elected the invention of Group II (Claims 49-75, and 79-84) and elected the species of FIG. 1A for the purposes of searching (claims readable on the elected species are Claims 49-63 and 65-67). Applicants also timely traversed the restriction requirement in their March 21, 2007 reply. New Claim 86, dependent on Claim 56, also belongs in Group II.

Accordingly, Claims 49-63, 65-67 and 86 are currently pending. Claims 1-36, 38-48, 64 and 68-85 are withdrawn. Claims 37 and 51 are cancelled.

Applicant note that the withdrawal of Claim 64, 68-75, and 79-84 is subject to non-allowance of the linking (generic) claims, namely Claims 49. According to M.P.E.P. §§809 and 804.01, the linking claims must be examined with the invention elected, and should any linking claim be allowed, the restriction requirement must be withdrawn. Accordingly, should the elected species be found allowable in view of the traversal of the rejection of Claim 49 under 35 U.S.C. §103(a), below, the Examiner should examine the linking claim (Claim 49), and, if allowable, the claims to non-elected species.

Amendment to the Abstract

The Examiner objected to the abstract of the disclosure because of its undue length. Applicants amended the abstract by significantly reducing its word count. Applicants believe that these amendments address the Examiner's objections.

Claim Amendments

Claims 49, 52-66, and 67 have been amended. Claim 51 has been cancelled.

Claim 49 has been amended to delete the recitation “the other” and insert the recitation “the reference beam or the object beam”.

Claim 56 has been amended to replace “a first” and “a second” with reference to two foci of an ellipsoidal reflective surface.

Claims 57, 61, and 62 have been amended to delete the word “about”.

Claims 57 and 58 have been amended to more particularly point out that the azimuthal arc may be any value between 0° and the indicated value. Support for this recitation is found on page 15, lines 9-12 of the specification as filed.

Claims 58-61 have been amended to make these claims dependent on Claim 56.

Claims 62-66 have been amended to make these claims dependent on Claim 51.

Claims 67 has been amended to delete “planar mirror” and replace it with the term “additional reflecting surface”, as recited in Claim 66 on which Claim 67 depends. Claim 67 has further been amended to delete “the” before “two foci”.

New Claim 86 has been added. Support for new Claim 86 is found on page 15, lines 9 through 11.

Additionally, Claims 52–56, 63, 65, and 66 have been amended to change their dependency due to cancellation of Claim 51.

These amendments introduce no new matter.

Claim Rejections Under 35 U.S.C. §112

The Examiner rejected Claims 49, 56, 57, 61, 62, and 67 under 35 U.S.C. §112, second paragraph, as being indefinite.

Claims 49 is rejected due to its recitation of limitation “the other”. The Examiner stated that there is insufficient antecedent basis for this recitation. Applicants amended Claim 49 to delete the recitation “the other” and insert the recitation “the object beam and the reference beam”.

Claim 56 is rejected due to recitations “the first focus” and “the second focus” with reference to the ellipsoidal reflecting surface. Applicants amended Claim 56 to recite “a first focus” and “a second focus” with reference to the two foci of the ellipsoidal reflective surface.

Claims 57, 61 and 62 are rejected due to recitation of the term “about” in reference to a numeric value. Applicants deleted the term “about”.

Claim 67 is rejected due to recitation of the term “the planar mirror” and, separately, the term “the two foci”. The Examiner stated that there are insufficient antecedent bases for these recitations. Applicants amended Claim 67 by deleting “planar mirror” and replacing it with the term “additional reflecting surface”, as recited in Claim 66 on which Claim 67 depends. Claim 67 has further been amended to delete “the” before “two foci”.

Applicants believe that these amendments address the Examiner’s objections.

Reconsideration and withdrawal of the rejections are respectfully requested.

Claim Rejections Under 35 U.S.C. §103(a)

The Examiner rejected Claims 49-63 and 65-67 as being unpatentable over U.S. 5,566,387 (“Dewald”) and U.S. Pat. App. Pub. US2003/0053232 (“Dalziel”).

The Examiner stated that Dewald discloses an apparatus for recording a holographically stored information comprising an aspherical reflecting surface having two focal points (elliptical mirror 76 shown in FIG. 2), an additional reflecting surface (element 70 shown in FIG. 2) and a motive device rotating the additional reflecting surface about a first axis, means for directing an object beam and a reference beam along their respective optical paths, wherein the object and reference beams intersect and form an interference pattern at a storage location in a recording media at or near one of the two focal points. The Examiner acknowledged that Dewald fails to disclose that the motive device rotates either the aspherical reflecting surface or the additional reflecting surface about the second axis, perpendicular to the first axis. However, the Examiner continued, Dalziel discloses an actuator-controlled mirror with a motive device that rotates a mirror independently around two axes. The Examiner stated that it would have been obvious for one of ordinary skill in the art to combine the teachings of Dewald and Dalziel because the motivation is “to produce an apparatus that changes the reflected direction of a beam in a controlled and accurate manner”.

Applicants disagree with the Examiner’s statements that the cited references provide motivation to modify the teachings of Dewald in a manner that would allow either element 70 or element 76 of Dewald’s FIG. 2 to be rotatable about two axes.

Dewald discloses an apparatus for recording/reading holographically stored information

in which holograms may be planar angle multiplexed. See Dewald, brief description of FIG. 5 and column 11, lines 8-12. Planar angle multiplexing is accomplished by rotating mirror 70 shown in FIG. 2 around a single axis that is perpendicular to the plane of the drawing. See Dewald, column 6, line 5. As a consequence, Dewald's device is used solely for planar angle multiplexing.

In contrast, an embodiment of Applicants' invention employs reflecting surfaces that are rotatable about two independent axes, and thus may be used to implement either one or a combination of azimuthal and planar angle multiplexing. See, for example, page 12, lines 1-8; page 16, lines 6-13; and page 16, line 14 through page 17, line 14, as well as throughout the specification.

Applicants direct the Examiner's attention to total lack of teachings or suggestion in Dewald of azimuthal multiplexing, much less a combination of azimuthal and planar angle multiplexing. Furthermore, as the Examiner acknowledged referring to Dewald's FIG. 2, Dewald fails to disclose that either mirror 70 or 76 can be rotated around two axes. Thus, Dewald does not provide motivation to modify his device by allowing the mirrors to rotate around two axes.

With respect to Dalziel, the Examiner stated that paragraphs [0018] and [0019] provide motivation to modify the apparatus of Dewald. The Examiner stated that such motivation is found in the ability of the device disclosed by Dalziel "to produce an apparatus that changes the reflected direction of a beam in a controlled and accurate manner".

Applicants note that further examination of Dalziel reveals that he discloses a two-dimensional galvanometer that "uses the Z-stop mechanism to substantially confine the movement of the mirror or the mirror assembly to rotation around one or more rotational axes without any significant translational movement". See Dalziel, [0023], FIG. 1, and [0024]. Two-dimensional galvanometers are known in the art. Applicants' application, for example, discloses that these devices are commercially available from such vendors as Cambridge Technology, Inc. (Cambridge, MA) and GSI Lumonics (Bedford, MA). See page 14, lines 6-10, of the present application. Dalziel's contribution to the art of two-dimensional galvanometers appears to be the use of a special mechanism (Z-stop mechanism) to enhance the accuracy of the reflection by preventing translational movement of the mirror.

Dalziel is devoid, however, of any reference to holography, much less to a combination of azimuthal and plane angle multiplexing. Applicants submit that desire to enhance accuracy of reflection from a movable mirror does not provide motivation to modify a holographic recording/reading device by allowing a mirror to rotate about two independent axes, thus implementing an additional type of multiplexing.

Thus neither Dewald nor Dalziel provide any reason for modifying the device of Dewald to allow either of Dewald's mirrors to be rotatable around two axes. It follows that neither reference motivates one of ordinary skill in the art to combine the teachings of Dewald and Dalziel. Accordingly, independent Claim 49 as well as claims dependent thereon are not obvious in view of the combination of these references. For similar reasons, independent Claim 72 and the claims dependent thereon are also non-obvious in view of Dewald in combination with Dalziel.

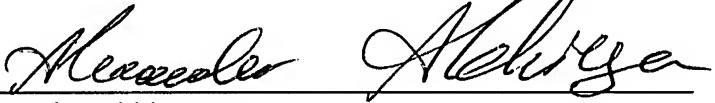
Reconsideration and withdrawal of the rejection are respectfully requested.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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